

WHAT IS CLAIMED IS:

- 1                    1.        A method of protecting a conductor in a micromachined device, said  
2 method comprising:
  - 3                    providing a substrate for a micromachined device;
  - 4                    providing a conductor as part of said micromachined device for use in  
5 conducting electrical signals during operation of said micromachined device;
  - 6                    providing a protective covering for said conductor so that said conductor is  
7 disposed between said substrate and said protective covering.
- 1                    2.        The method as described in claim 1 wherein said protective covering  
2 comprises polysilicon.
- 1                    3.        The method as described in claim 1 wherein said providing a  
2 protective covering comprises depositing said protective covering as a layer of material.
- 1                    4.        The method as described in claim 3 wherein said layer of material  
2 protects a plurality of conductors.
- 1                    5.        The method as described in claim 1 and further comprising:  
2                    electrically coupling said protective covering with said substrate so as to  
3 configure a ground ring around said conductor.
- 1                    6.        The method as described in claim 1 and further comprising:  
2                    configuring said protective covering so as to form a tunnel relative to said  
3 conductor.
- 1                    7.        The method as described in claim 1 and further comprising:  
2                    not depositing a passivation layer over an active mechanical component of  
3 said micromachined device.
- 1                    8.        A micromachined device comprising:  
2                    a substrate;

3                   a conductor configured as part of said micromachined device;  
4                   a protective covering disposed over said conductor so that said conductor is  
5 disposed between said substrate and said protective covering.

1                   9.       The device as described in claim 8 wherein said protective covering  
2 comprises polysilicon.

1                   10.     The device as described in claim 8 wherein said protective covering is  
2 deposited as a layer of material.

1                   11.     The device as described in claim 10 wherein said layer of material  
2 protects a plurality of conductors.

1                   12.     The device as described in claim 8 wherein said protective covering is  
2 electrically coupled with said substrate so as to form a ground ring around said conductor.

1                   13.     The device as described in claim 8 wherein said protective covering is  
2 configured so as to form a tunnel relative to said conductor.

1                   14.     The device as described in claim 8 wherein said device is configured  
2 for operation without a passivation layer disposed over said conductor.

1                   15.     A method of protecting a conductor in a micromachined device, said  
2 method comprising:

3                   providing a micromachined device comprising a substrate;

4                   providing a conductor as part of said micromachined device;

5                   providing as part of said micromachined device a protective covering, wherein  
6 said conductor is disposed between said protective covering and said substrate of said  
7 micromachined device.

1                   16.     The method as described in claim 15 wherein said providing a  
2 protective covering comprises utilizing polysilicon as said protective covering.

1                   17.     The method as described in claim 15 wherein said providing said  
2 protective covering comprises depositing said protective covering as a layer of material.

1                    18.     The method as described in claim 17 wherein said layer of material  
2 protects a plurality of conductors.

1                    19.     The method as described in claim 15 and further comprising:  
2                    electrically coupling said protective covering with said substrate so as to  
3 configure a ground ring around said conductor.

1                    20.     The method as described in claim 15 and further comprising:  
2                    configuring said protective covering so as to form a tunnel relative to said  
3 conductor.

1                    21.     The method as described in claim 15 and further comprising:  
2                    not depositing a passivation layer over an active mechanical component of  
3 said micromachined device.

1                    22.     A micromachined apparatus comprising:  
2                    a substrate;  
3                    a bonding pad;  
4                    a conductor disposed over said substrate, wherein said conductor is electrically  
5 coupled with said bonding pad;  
6                    an active mechanical component disposed over said substrate, wherein said  
7 active mechanical component is configured to move relative to said substrate;  
8                    a protective cover disposed over said conductor so that said conductor is  
9 disposed between said protective cover and said substrate.

1                    23.     The apparatus as described in claim 22 wherein said active mechanical  
2 component comprises a mirror.

1                    24.     The apparatus as described in claim 23 wherein said mirror comprises  
2 silicon.

1                   25.     The apparatus as described in claim 22 wherein said active mechanical  
2 component is exposed to the atmosphere during operation of said apparatus.

1                   26.     The apparatus as described in claim 22 wherein a portion of said  
2 conductor is exposed to the atmosphere during operation of said apparatus.

1                   27.     The apparatus as described in claim 22 wherein said protective cover  
2 comprises an polysilicon.

1                   28.     The apparatus as described in claim 22 wherein said protective layer of  
2 material is operable to protect said conductor from an electrical short when a voltage of at  
3 least 100 Volts is applied to said protective layer of material.

1                   29.     The apparatus as described in claim 22 wherein said protective layer of  
2 material is configured so as to form a ground ring with said substrate around said conductor.

1                   30.     The apparatus as described in claim 22 wherein said protective layer of  
2 material is configured so as to form a tunnel relative to said conductor.

1                   31.     The apparatus as described in claim 22 wherein said apparatus is  
2 configured for operation without depositing a passivation layer.

1                   32.     A method of providing a micromachined apparatus, said method  
2 comprising:

3                   providing a substrate;

4                   disposing a bonding pad over said substrate;

5                   disposing a conductor over said substrate, wherein said conductor is  
6 electrically coupled with said bonding pad;

7                   disposing an active mechanical component over said substrate, wherein said  
8 active mechanical component is configured to move relative to said substrate during  
9 operation of said micromachined apparatus;

10                  disposing a protective cover over said conductor so that said conductor is  
11 disposed between said protective covering and said substrate.

- 1                    33.     The method as described in claim 32 wherein said active mechanical  
2     component comprises a mirror.
- 1                    34.     The method as described in claim 33 wherein said mirror comprises  
2     silicon.
- 1                    35.     The method as described in claim 32 wherein said active mechanical  
2     component is exposed to the atmosphere during operation of said micromachined apparatus.
- 1                    36.     The method as described in claim 32 wherein a portion of said  
2     conductor is exposed to the atmosphere during operation of said micromachined apparatus.
- 1                    37.     The method as described in claim 32 wherein said protective cover  
2     comprises polysilicon.
- 1                    38.     The method as described in claim 32 wherein said protective cover is  
2     operable so as to protect said conductor from an electrical short when a voltage of at least 100  
3     Volts is applied to said protective cover.
- 1                    39.     The method as described in claim 32 and further comprising:  
2                    electrically coupling said protective cover with said substrate so as to  
3     configure a ground ring around said conductor.
- 1                    40.     The method as described in claim 32 and further comprising:  
2                    configuring said protective cover so as to form a tunnel relative to said  
3     conductor.
- 1                    41.     The method as described in claim 32 and further comprising:  
2                    not depositing a passivation layer over an active mechanical component of  
3     said micromachined apparatus.
- 1                    42.     A method of configuring a micromachined apparatus, said method  
2     comprising:  
3                    providing a bonding pad as part of said micromachined apparatus;

4 providing an active mechanical component, wherein said active mechanical  
5 component is configured to move during operation of said micromachined apparatus;

6 disposing a conductor between said active mechanical component and said  
7 bonding pad;

8 protecting at least a portion of said conductor disposed between said active  
9 mechanical component and said bonding pad with a protective layer of material operable to  
10 protect said conductor from electrical shorts.

1 43. The method as described in claim 42 wherein said providing an active  
2 mechanical component comprises providing a mirror.

1 44. The method as described in claim 42 and further comprising  
2 configuring said active mechanical component so as to be exposed to the atmosphere during  
3 operation of said micromachined apparatus.

1 45. The method as described in claim 42 wherein said protective layer of  
2 material protects said conductor when a voltage of at least 100 Volts is applied to said  
3 protective layer of material.

1 46. The method as described in claim 42 and further comprising:  
2 configuring said protective layer of material so as to form at least part of a  
3 ground ring around said conductor.

1 47. The method as described in claim 42 and further comprising:  
2 configuring said protective layer of material so as to form a tunnel relative to  
3 said conductor.

1 48. The method as described in claim 42 and further comprising:  
2 not depositing a passivation layer over said active mechanical component.

1 49. A micromachined apparatus comprising:  
2 a bonding pad;

3                    an active mechanical component configured to move during operation of said  
4 micromachined apparatus;

5                    a conductor disposed between said active mechanical component and said  
6 bonding pad;

7                    a covering configured so as to protect at least a portion of said conductor  
8 disposed between said bonding pad and said active mechanical component from electrical  
9 shorts.

1                    50.     The micromachined apparatus as described in claim 49 wherein said  
2 active mechanical component comprises a mirror.

1                    51.     The micromachined apparatus as described in claim 49 wherein a  
2 portion of said conductor is exposed to the atmosphere during operation of said  
3 micromachined apparatus.

1                    52.     The micromachined apparatus as described in claim 49 wherein said  
2 covering is configured so as to protect said conductor when a voltage of at least 100 Volts is  
3 applied to said covering.

1                    53.     The micromachined apparatus as described in claim 49 wherein said  
2 covering is configured so as to form at least part of a ground ring around said conductor.

1                    54.     The micromachined apparatus as described in claim 49 wherein said  
2 covering is configured so as to form a tunnel relative to said conductor.

1                    55.     The micromachined apparatus as described in claim 49 wherein said  
2 micromachined apparatus is configured without depositing a passivation layer.

1                    56.     A method comprising:

2                    providing a substrate;

3                    disposing a conductor over said substrate operable for conducting electrical  
4 signals;

5                    configuring an equipotential barrier at least partially around said conductor  
6 operable for protecting said conductor from electrical shorts.

1                    57.     The method as described in claim 56 wherein said configuring an  
2 equipotential barrier comprises:

3                    depositing polysilicon over said conductor; and  
4                    electrically coupling said polysilicon with said substrate so as to form an  
5 equipotential ring.

1                    58.     The method as described in claim 57 and further comprising:  
2                    electrically coupling said equipotential ring to a circuit ground.

1                    59.     The method as described in claim 56 wherein said configuring an  
2 equipotential barrier comprises:  
3                    configuring a tunnel of electrically conductive material over said conductor;  
4 and  
5                    coupling said electrically conductive material with said substrate.

1                    60.     The method as described in claim 59 and further comprising:  
2                    electrically coupling said equipotential barrier to a circuit ground.

1                    61.     An apparatus comprising:  
2                    a substrate;  
3                    a conductor disposed over said substrate, said conductor operable for  
4 conducting electrical signals;  
5                    an equipotential barrier disposed at least partially around said conductor and  
6 operable for protecting said conductor from electrical shorts.

1                    62.     The apparatus as described in claim 61 wherein said equipotential  
2 barrier comprises polysilicon; and  
3                    wherein said polysilicon is electrically coupled with said substrate so as to  
4 form an equipotential ring.



1                    63.     The apparatus as described in claim 62 wherein said equipotential ring  
2 is configured for coupling to a circuit ground during operation of said apparatus.

1                    64.     The apparatus as described in claim 61 wherein said equipotential  
2 barrier comprises a conductive material configured as a tunnel over said conductor; and  
3                    wherein said conductive material is electrically coupled with said substrate.

1                    65.     The apparatus as described in claim 64 wherein said equipotential  
2 barrier is configured for coupling to a circuit ground during operation of said apparatus.